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# Role of Nutrition in Mental Well-Being

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## ABSTRACT

**Introduction:** A healthy lifestyle plays a pivotal role in maintaining a healthy mind. Dietary balance acts as a major modifiable factor for overall health. Research has shown more risk for metabolic syndrome, cardiac illness, endocrinological disorders, respiratory infections in patients with mental illness (due to medications (an adaptation of an unhealthy lifestyle).

**Objective:** To highlight the various dietary supplements role in patients suffering from various psychiatric illnesses.

**Methods:** Various search engines were explored like PubMed, PsycInfo, ScienceDirect, MEDLINE, Scopus, and GoogleScholar and Cochrane Central Register of Controlled Trials. Result: Various dietary supplements play the role as an augmentation therapy or as the main treatment in milder/initial cases depending upon the state of the psychiatric illness.

**Conclusion:** We should also emphasize on the maintenance of a healthy lifestyle (regular exercise, diet, sleep) along with the regularity of the treatment. Treating doctor should also attempt to include these dietary supplements in patient's treatment to increase the efficacy of the medication and in turn, decrease the side effects due to the medications.

**Key Words:** Nutrition, Diet, Lifestyle, Mental health, Psychiatric illness

## INTRODUCTION

Mental health is gradually becoming a major public health issue worldwide. Psychiatric illness contributes to approx. 13% of the global burden of disease in terms of disability-adjusted life-years (equivalent to cardiovascular and circulatory diseases).<sup>1</sup> On analysis of the Indian population, almost 200 million people are suffering from a mental disorder, which includes 45·7 million (42·4–49·8) with depressive disorders and 44·9 million (41·2–48·9) with anxiety disorders.<sup>2</sup>

It is therefore imperative to deal with this increasing trend of mental disorder otherwise it will hamper people's overall quality of life, increase mortality and disability due to mental illness and may worsen the underlying/co-morbid medical illness (Alexopoulos GS 2005). Also, mental disorders if not dealt properly can increase the suicide rates, economic loss (absenteeism from work) and disrupts overall family functioning. Also, mental illness increases the chances of much major physical illness- cardiac illness, endocrine disorders, respiratory illness and many more. Therefore, a mental dis-

order causes a huge impact on the individual as well as the whole society.<sup>3</sup>

Like the major medical illnesses (hypertension, diabetes, cardiac illness), mental illness also the focus has shifted to preventive measures for the same. Numerous epidemiological studies are going on to elaborate modifiable risk factors for the prevention of mental illness; dietary factors have emerged to be one such significant factor. It has been proposed that different dietary patterns, foods, and nutrients may affect the onset, maintenance, and severity of mental disorders.<sup>4</sup> Various biological and epidemiological studies have highlighted the role of diet/nutrition in the prevention/cure of mental disorders but still, the exact mechanism behind it needs a lot of exploration.

The present review attempts to concise the significant findings of the research on the role of nutrition in mental well-being. Also, an attempt has been made to enumerate the role of specific nutrients in specific mental illness for the better understanding of exactly what to be eaten for better mental health<sup>5</sup>.

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## ROLE OF NUTRITION IN MENTAL HEALTH

The fat content of our brain is formed by essential fatty acids (omega 3, 6); which are majorly provided from outside food which in turn helps in the healthy development of brain neurons.<sup>6</sup> The diet which we consume on daily bases has been

broadly categorized into three types: traditional (vegetables, fruit, beef, lamb, fish, whole-grain foods), western (meat pies, processed meats, pizza, chips, hamburgers, white bread, sugar, flavoured milk drinks, beer), and modern (fruits, salads, fish, tofu, beans, nuts, yoghurt, red wine).<sup>7</sup>

**Table 1: Major studies of nutrition and Mental health**

Psychiatric Illness	Details of Author	Nutrition under study	Major Highlights
DEPRESSION	Penckofer S et al., 2010	Vitamin D rich diet	Lower risk of depression
	Maurizi CP, 1990	Omega 3 Fatty acid as adjuvant therapy	Lower risk of depression, Mood Disorder
	Mohandas E and Rajmohan V, 2007	Minerals and vitamins (folate, vitamin B12)	Lower risk of depression
	Eritsland J, 2000; Stoll AL et al., 1999	selenium and zinc	Lower risk of depression
	Valles-Colomer M et al., 2019	Microbiome- Gut-associated microorganisms (GBMs- Coprococcus, Dialister and Butyrivibrio	Increases serotonin (via tryptophan)
BIPOLAR AFFECTIVE DISORDER	Stoll AL, 1999	omega 3 fatty acids	better in other areas- cognition, social and occupational fronts
SCHIZOPHRENIA SPECTRUM DISORDER	Aucoin M et al., 2018	poor dietary habits use of refined carbohydrates and fat; low fibrous diet, omega-3 and omega-6 fatty acids, vegetables, fruit, and certain vitamins and minerals (vitamin B12 and B6, folate, vitamin C, zinc, and selenium)	Increases chances of metabolic syndrome with medications
DEVELOPMENTAL DISORDER	Humphries K et al., 2004	Poor Nutrition	Secondary Learning disability
EATING STORE	Hilbert A et al., 2017	Poor Nutrition	Lower response to treatment
ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD)	Sinn N, 2008	Low levels of iron, zinc, and magnesium	High risk of ADHD
ADDICTION	Cook CC, 1998	Malnutrition (deficiency of certain vitamins and minerals)	increase chances of anaemia, neurological complications (cognitive dysfunction, night blindness, Wernicke's encephalopathy, and Korsakoff's Psychosis in alcoholic patients
COGNITIVE DECLINE	Valls-Pedret C et. al 2012; 2015	poor glucose-regulation; polyphenols and Mediterranean diet supplements with olive oil and nuts	Cognitive decline in both younger and older individuals

## Depression

Research have linked obesity, depression and dietary factors with more depressive symptomatology in individuals with faulty dietary habits and being overweight. It has also been observed that females consuming vitamin D rich food items were at lower risk for depression.<sup>7</sup> Research also signifies the role of omega-3 as an effective adjunctive therapy for major depressive disorder.<sup>8</sup> Various studies have supported this observation, and have identified omega 3 fatty acid as one of the contributing factors in the causation of mood disorders as consistently lower levels of this compound is observed in these groups.<sup>9</sup> It also helps in improving inflammation, therefore, might be beneficial in neurotransmitter generation.<sup>10</sup> A low-fat diet has shown to have mood deprivation properties; altered dietary fat intake can lead to decreased concentration and low energy levels, high protein intake increases alertness. Minerals and vitamins (folate, vitamin B12) also play a pivotal role in causation and improvement of depression.<sup>11</sup> Folate deficiency can lead to various neuropsychiatric manifestations of which depression is most common.<sup>12</sup> Almost 25% of lower levels are observed in depressed individuals in comparison to their healthy counterpart. The study has also attempted to compare the level of improvement with and without the inclusion of folate along with SSRIs and observed greater improvement with the combination.<sup>13</sup>

Low levels of selenium and zinc have been linked with depressed mood.<sup>14</sup> Trial of oral zinc as an adjunctive treatment has also been tried and found to improve the effectiveness of antidepressants.<sup>15</sup> Studies have also noted that diet containing sugar, starch (refined), saturated/trans fatty acids, low anti-oxidants and fibrous foods may increase the prevalence of depression.<sup>16,17</sup> Though these findings are still preliminary, there is no harm in incorporating dietary advice regularly with the ongoing treatment for depression.<sup>18,19</sup> Research in areas of psychoneuroimmunology and chemical pathways is indicative of a link between nutrition, healthy immune system and smooth functioning of the central nervous system which in turn is responsible for the psychological wellbeing of an individual.<sup>20</sup> Researches have started identifying diet and nutrition as an important preventive factor for mental disorders.<sup>21</sup>

Forgetfulness is a major concern in much psychiatric illness, it can be improved by memory enhancing foods like- berries (contains flavonoids)<sup>22</sup>; nuts (omega-3 fatty acid called alpha-linolenic acid).<sup>23</sup> Caffeine also enhances memory by increasing concentration and attentiveness.<sup>24</sup>

Healthy mental health strongly influences our physical health also. Studies have found a positive correlation between the two. Depression and other mental illness can worsen or leads to various medical illnesses like sleep disturbances, cardiovascular disease, gastrointestinal disease, diabetes (due to metabolic syndrome) and fatigability. As famously known-

“Let food be thy Medicine-Hippocrates”. When mental health imbalance occurs as in depression, anxiety disorders etc., doing something about it as early as possible can improve overall Quality of Life (QoL). Microbiome population study found a link between microbiome variations in the gut with worsening of overall QOL, a significant indicator for depression. Gut-associated microorganisms (GBMs- Coprococcus, Dialister and Butyricicoccus have been linked to the formation of dopamine metabolites and in turn with QOL and depression. It is also observed that levels of these microorganism changes with and without antidepressant treatment with depleted levels in treatment-free depression. Various microbial pathways are common pathways for depression also, including GABA and tryptophan metabolism, indicating the probability of host-microbe symbiosis.<sup>25,26</sup> Sources rich in tryptophan (which in turn increases serotonin levels in the brain) like flaxseeds, lentils, bananas, nuts, turkey, yoghurt, milk; if non-vegetarian, fish, eggs and milk have some role in increasing these GBMs in the body.<sup>27-29</sup>

## Bipolar Affective Disorders

Study on bipolar patients has shown a link between omega 3 fatty acids and improvement in the overall course of the illness. Studies comparing the response of omega 3 fatty acids, mood stabilizer (lithium carbonate/valproate) and placebo (olive oil) found longer remission rates in patients on omega 3 fatty acids than the placebo group. Omega 3 fatty acid group also performed better in other areas- cognition, social and occupational fronts.<sup>28,29</sup>

## Schizophrenia Spectrum Disorder(includes psychosis)

Nutrition plays a vital role in patients with psychosis to improve overall health and to curtail the side effects of antipsychotic medication like metabolic syndrome. Observational studies have linked poor dietary habits use of refined carbohydrates and fat; low fibrous diet, omega-3 and omega-6 fatty acids, vegetables, fruit, and certain vitamins and minerals (vitamin B12 and B6, folate, vitamin C, zinc, and selenium).<sup>30,31</sup> Studies have observed that patients suffering from psychosis have faulty eating patterns and lack organization of proper meals<sup>32</sup> in like- major meals in evening with skipping morning meals, eating hastily<sup>33,34</sup>, preferences for junk foods.

Research has observed significantly high levels of glycosylated haemoglobin and insulin, increased waist circumference and diastolic blood pressure in individuals with schizophrenia in comparison to their healthy counterpart. Therefore, these findings support the significance of healthy dietary pattern and physical wellbeing to be equally contributable as a part of the treatment in individuals with schizophrenia in turn decreasing the overall burden of the disease.<sup>36,37</sup>

## Developmental Disorders

In regards to Developmental/Intellectual disorders, it was found in systematic nutrition review that poor nutrition (e.g. anaemia) in itself is considered as a risk factor for causation of secondary learning problems further affecting the existing illness.<sup>38-40</sup>

## Eating Disorders

Right knowledge regarding the nutrition values of a particular item aids in better therapeutic response in individuals with eating disorders. Nutrition therapy plays a significant role along with the pharmacological therapy in these individuals.<sup>41-43</sup>

## Attention Deficit Hyperactivity Disorder

Low levels of iron, zinc, and magnesium have shown to worsen the hyperactivity and concentration/ attention problems in children with ADHD. The strongest evidence of nutrition role so far is of omega-3 polyunsaturated fatty acids (PUFA).<sup>44-46</sup>

## Addiction

Nutrition has a role in addiction disorders, specifically alcohol dependence syndrome. Patients with alcohol dependence commonly present with malnutrition (protein-calorie malnutrition) which in turn is a predictor of survival rate in comorbid alcohol liver disease (ALD). Also, deficiency of various vitamins and minerals contributes to the malnutrition- folate, thiamine, pyridoxine, and vitamin A, in turn, increasing the chances of anaemia, neurological complications (cognitive dysfunction, night blindness, Wernicke's encephalopathy, and Korsakoff's Psychosis).<sup>47-49</sup>

## Cognitive decline/Dementia/Aging

Nutrition deficiency can contribute to or worsen cognitive dysfunction. Vascular impairments caused by faulty diet are commonly associated with Alzheimer's and other dementias. It has also been observed poor glucose-regulation to be responsible for cognitive problems even in younger population.<sup>50-51</sup> Nutrition not only plays role in old age, but a healthy diet also reduces future risk of cognitive decline in an adult. There has also been some research highlighting the role of polyphenols and Mediterranean diet supplements with olive oil and nuts in improving cognitive functioning in adult and older population.<sup>52</sup>

## DISCUSSION

The exact mechanism how nutrition plays a therapeutic/preventive measure is still not clear, but it has been proposed that nutrients and their metabolites are consumed in higher quantity than drugs and tend to bind and affect many tar-

gets in multiple organs at a time. Though research is still not conclusive indicative of inclusion of following food items in routine diet might decrease the chance of having depression or decrease the ongoing depression- Green leafy vegetables as kale, spinach; broccoli (contains vitamin K, lutein, folate, and beta carotene); Fatty fish, flaxseeds, avocados, and walnuts (contains omega 3 fatty acids); healthy unsaturated fatty acids (lowers beta-amyloid levels, in turn, improving dementia). Simultaneously individual can adapt various healthy ways to keep their mind and physical health healthy besides a healthy diet- regular exercise/yoga, meditation, anger management.<sup>53</sup> Studies have observed, "whole foods" (with fruit, vegetables, and fish characteristic of intake) to be associated with lesser chances of psychiatric illness than processed foods (largely represented by processed meat and bread products and high-fat dairy products).<sup>54</sup>

Focus on nutrition as an adjuvant treatment is gradually gaining access in many areas of psychiatric illness. A new research field has also emerged- Nutritional Psychiatry which offers potential in identification of the role of dietary components in mental health, including in psychiatric illness, under what circumstances and dosage these interventions are needed and also their role as preventive and therapeutic measures.<sup>55</sup>

## CONCLUSION

Research done so far acknowledges the role of addition of following nutrition in our diet, including fruits and vegetables, grains, nuts, milk and milk products, animal products with limitation of sugar, white flour products floors(like bread, baked goods, cereals, and pasta), animal fats and processed meats. Studies have also shown the Mediterranean diet to be aiding in preventing mental illness. Healthy diet aids in maintaining both physical and mental wellbeing in form of lower incidences of Diabetes, Hypertension, Cardiovascular Disease, and Stroke. Therefore, a balanced diet decreases major chronic medical conditions, also help patients to deal with the metabolic side effects caused by the majority of the psychotropic medications and also decreases the prevalence of mental disorders. Still, lots of large field trials are needed to learn the exact role of nutrition as a modifiable factor in various mental illnesses. But evidence collected till now strongly suggests enrolling of nutrition therapy in the majority of the mental and medical illnesses. More focus should be given to the emerging field i.e. nutritional psychiatry which focuses or studying the pattern of diet role in mental health. More emphasis should be given to nutraceuticals as mood modifying and cognitive-enhancing agents in both clinical and healthy individuals.

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